Combining Keynes and Schumpeter. Ingvar Svennilson's Contribution to the Swedish Growth School and Modern Economics[*]

by

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Abstract

In a study of European growth in the interwar period, the Swedish economist Ingvar Svennilson integrated a Keynesian theory of cumulative growth with a Schumpeterian analysis of economic transformation. Svennilson emphasised that innovations and the use of new technologies had been stimulated by high demand and production growth. Svennilson's strong commitment to "Verdoorn's Law", which actually was "Svennilson's Law", made it difficult to incorporate him in a Schumpeterian tradition. A synthesis between Keynes and Schumpeter with Svennilson as a mediator was also prevented by the decisive role of entrepreneurship and the critique of Keynesian models in works by Schumpeter and the Swedish growth school. However, a synthesis has been facilitated by neo-Schumpeterian theories of demand-led innovations and cumulative economic processes. Svennilson's study has been superseded by later contributions to economics except for a theory of a negative, "Keynesian", relationship between unemployment and growth and an exceptional "un-Verdoornian" theory that high aggregate demand may lead to crowding-out of new firms from capital markets. Besides, Svennilson's integration of short run and long run macro analysis and of theoretical and empirical work is still a fruitful research strategy in economics.

Keywords: Innovations - Cumulative Growth – Productivity Growth - Verdoorn's Law - Swedish Growth School

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1 Introduction

In *Growth and Stagnation in the European Economy*, henceforth *GSEE*, the Swedish economist Ingvar Svennilson analysed the industrial development in Europe 1913-1938 (Svennilson, 1954a).[1] Since the study covered two complete business cycles, Svennilson referred to an analysis of the medium term (Svennilson, 1954a, p. 3, 1954b, p. 1). His main task was to explain why the most industrialised countries in Europe - Great Britain, Germany, France and Belgium – experienced a worse growth performance in the interwar period than in the late 19th and early 20th centuries. Svennilson's study was based on an economic theory that partly preceded, partly embedded, the detailed industry and country surveys. The theory can roughly be labeled as Keynesian-Schumpeterian. It was rooted in the sequential version of Keynesianism developed in the 1930s by Swedish economists influenced by Knut Wicksell's ideas of cumulative processes. Svennilson belonged to "the Stockholm school" by having formulated a microeconomic model where firms' investments are governed by expectations, e.g. determined (sequentially) by past developments (Svennilson, 1938). However, at the time of *GSEE*, Svennilson was strongly influenced by Schumpeter and by Erik Dahmén, a Swedish economist who worked in the tradition of Schumpeter and the American institutionalist school (the Veblen-Mitchell tradition).

GSEE attracted the attention of many development economists in the 1950s and the 1960s (see e.g. Kuznets, 1966). But neither the theoretical development in economics nor the orientation of later historical studies was influenced by Svennilson's *magnum opus*. Growth theory took, by its formal-mathematical and aggregate character and its separation between short and long run analysis, another path than the one that Svennilson had staked out in *GSEE*. At the same time, the approach of *GSEE* was too selective, quantitative, macroeconomic and instrumental (policy oriented) to satisfy historians with an ambition to offer full explanations (see Parker, 1956, pp. 245 and 252-253). *GSEE* fell between the cracks when growth research was divided into a theoretical and a historian branch in the 1950s and 1960s.[2]

[1] Svennilson's research project was initiated by the UN and partly financed by the Rockefeller Foundation.

[2] Svennilson was still a respected name among leading economists. At the Nobel banquet 1970, the price winner Paul A Samuelson referred to a group of Swedish great masters including Svennilson,

The growing interest in economic growth and innovations in the 1980s and 1990s led to a renaissance for *GSEE*. The study became a salient reference at Swedish studies of the effects of economic policy on structural change and growth (Erixon, 1991, 1997, 2001). Svennilson was seen, together with Dahmén and his mentor Johan Åkerman, as prominent representatives of a unique Swedish growth school in economics (Pålsson Syll, 1995; Johansson and Karlson, 2002; Eliasson, 2003).

This paper describes the content of *GSEE* with a particular eye on theoretical novelties compared to earlier works by Svennilson (Sect. 2). A separate section explores Svennilson's analysis of the importance of business cycle swings and economic policy for economic growth (Sect. 3). The following section scrutinises whether Svennilson managed to bridge the gap between Keynesian and "structural" economists such as Schumpeter, Åkerman and Dahmén (Sect. 4). *GSEE* is then compared with a related study from the early 1990s of the effects of Swedish devaluations on structural change and economic growth (Sect. 5). The subsequent section compares the economic theories of *GSEE* with those of modern macroeconomics (Sect. 6). The comparison ends up with a discussion of the relevancy of *GSEE* (Sect. 7).

The focus in the paper is on the underpinning economic theory, not on the specific analysis in *GSEE* of economic developments and prime driving forces in the European economies during the interwar period. The paper's most important source beside *GSEE* is an article in Swedish by Svennilson where he summarises his theory and also states his ideas more precisely (Svennilson, 1954b).

Bertil Ohlin, Gunnar Myrdal, Erik Lundberg, Gustav Cassel, Erik Lindahl and Knut Wicksell (Samuelson, 1970).

2 The New Svennilson

Svennilson's Law

Since the end of the 1930s, Svennilson had embraced a hypothesis that high production growth leads to high productivity growth. Svennilson claimed in the mid 1940s that he had shown such a relationship for countries and industries (Svennilson, 1944). Economists are referring to ”Verdoorn's Law” today. But it is equally legitimate to refer to ”Svennilson's Law” (Lundberg, 1972, pp. 315-316). The article on the relationship between production and productivity growth by the Dutch economist P.J. Verdoorn was not published until 1949 (Verdoorn, 1949). Svennilson had probably influenced Verdoorn during their work at the UN Economic Commission for Europe in Geneva in the late 1940s (Henriksson, 1990, p. 165).

Svennilson's explanation of why high production growth has a positive effect on productivity developments did not rest, as many (post-)Keynesian theories, on an assumption of static scale advantages or learning-effects in production. Instead, Svennilson stressed that the introduction of new technologies requires investments in physical capital. Firms extending their production capacity have the opportunity to use the latest technologies. Hence, high production growth will stimulate the use of new technologies and consequently enhance labour productivity growth (Svennilson, 1944, pp. 240–242).

Svennilson's interpretation of Verdoorn's Law in (Svennilson, 1944) has strong similarities with Wilfred Salter's and Robert Solow's vintage theories of later date (Salter, 1960; Solow, 1964, 1969, ch. 3). However, in contrast to Svennilson, Salter and Solow emphasised that new vintages constitute a real threat to ”marginal” vintages, thus to vintages with a minor difference between prices and variable unit costs in the initial state.[3] Real wages will rise as a consequence of the new units' demand for scarce labour or production increases. In the latter case, commodity prices will decrease provided that total supply has increased and commodity markets are competitive. The

[3] Svennilson explicitly assumed that the length of life of machines was *not* a function of the introduction of new technologies (Svennilson, 1944, p. 240).

increase in real wages makes it more difficult for marginal vintages to give contributions to the coverage of fixed costs. A closure of low-productive units will in turn result in an instant increase in aggregate labour (and total factor) productivity and also to a release of resources for structural change. (We assume that *ex post* factor substitution is impossible.) The absence of a similar discussion of the competitive relation between old and new vintages in (Svennilson, 1944) shows that Svennilson still lacked a transformation perspective when analysing the relation between production and productivity growth.

Svennilson returned to Verdoorn's Law in *GSEE*. He still observed a strong correlation between production and productivity growth for the interwar period. For example, Sweden and other countries with a high GDP growth experienced high labour productivity growth. Svennilson had no access to statistical methods defining the causality at stake. Yet, he asserted that high production growth had led to high productivity growth and not the other way round (Svennilson, 1954a, p. 57).

Our empirical picture of the relation between production and productivity growth is not enriched by *GSEE* in comparison with (Svennilson, 1944). On the other hand, *GSEE* contains, in relation to earlier publications by Svennilson, a more developed theory of why changes in GDP have an impact on investments and long run growth. Svennilson focuses on the possibility of reinforcing cumulative processes.

Cumulative growth models

Svennilson considers two cases of self-generating cumulative processes (Svennilson, 1954a, p. 6, 1954b, pp. 8-10). According to Svennilson, both cases may give rise to a positive investment trend and therefore to long run economic growth. The first case is based on an assumption of macroeconomic balance. A higher production growth will trigger off a cumulative process since physical capital (C) is included in the production function for GDP (Y) and $\Delta C = sY$ (if depreciations are ignored) where s is the propensity to save in the economy. The case is very similar to the Solow model of a closed, one-commodity, economy. A salient difference between Svennilson's cumulative growth theory assuming macroeconomic balance and the Solow model is that s is

exogenous in the Solow model but a function of Y in *GSEE* - the higher the level of GDP, the higher is the saving ratio. However, Svennilson did not discuss the origin of the initial production change.

Macroeconomic balance is not assumed in Svennilson's second case of a cumulative endogenous process. Here, an investment trend will emerge by a multiplicator-accelerator mechanism. The accelerator reflects that demand for capital goods is a function of changes in GDP. Aggregate demand is thereby partly endogenous (by the accelerator), partly a primary driving force when determining long run growth. Svennilson declared that his growth theory was akin to Roy Harrod's dynamic version of Keynes's effective demand theory (Harrod, 1948; Svennilson, 1954a, p. 6, 1954b, pp. 9-10). It is noteworthy that Svennilson's two models of cumulative processes in *GSEE* were based on contemporaneous, not on sequential, causal relationships, especially as he, by way of introduction, had revealed a loyalty towards the sequential analysis of the Stockholm school (Svennilson, 1954a, p. 3, 1954b, p. 2).[4]

Svennilson considers other business-cycle variables than the accelerator when elucidating the determinants of investments in *GSEE*. Investments are influenced by expected and realised profits, money supply and interest rates, variables that may be affected by stabilisation and industrial policy. Short-run changes in these macroeconomic variables can generate an investment trend if either peak or trough conditions dominate a period which cover at least a business cycle (Svennilson, 1954a, p. 6, 1954b, pp. 9-10 and 25). Probably, Svennilson also expected that an investment trend could arise by political-institutional and economic-structural changes (see below). These changes might engender trends in the independent macroeconomic variables or affect their relations to investments (cf. Svennilson 1954a, p. 3, 1954b, p. 2).

Thus, Svennilson's ambition in *GSEE* was to relate the ideas of deficit demand and cumulative developments in the Stockholm school and (post-)Keynesian traditions to his earlier "Verdoornian" analysis of economic growth. He emphasised, by references

[4] A contemporaneous relationship between two variables is instant, i.e. it occurs during the same period, but it is often possible to treat one variable as exogenous (see, for instance, the multiplier-accelerator theory in Harrod's version). A sequential relationship is one where effects follow cause on a real time scale, thus making it possible to define a certain time lag structure (see Hicks, 1979, pp. 21-24, 74 and 87).

to a "Wicksell-Keynesian" tradition, that short-run macroeconomic imbalances could be decisive for a country's growth performance e.g. by generating a cumulative process (see the accelerator). Hence, Svennilson's determination of long-run economic growth in *GSEE* was based on short-run configurations. Moreover, the discussion of the determinants of investments was more elaborate in *GSEE* than in earlier publications by the author. However, the endeavours to combine a Wicksell-Keynesian analysis of investments, short-run macroeconomic disturbances and cumulative historical processes with a structural, "Schumpeterian", approach were a more fundamental indication of a new Svennilson in *GSEE*. The study was clearly inspired by Erik Dahmén's dissertation on the industrial development in Sweden in the interwar period published in 1950 (Dahmén, 1970). Svennilson's notion of *transformation* is the most obvious expression of an influence from Dahmén.

Production growth and transformation

Svennilson defined six aspects of transformation in *GSEE*: (1) changes of production methods, mainly in the direction of mechanisation, (2) changes of input-output relations between raw materials and finished goods, (3) development of new end-products and shifts in the distribution of consumption between various end-products, (4) changes in exports and imports in relation to the output of domestic industry, (5) redistributions of the labour force between different industries and occupations and (6) regional redistributions of population and production.

Svennilson claims that he had only considered the fourth aspect on transformation before *GSEE* (see the reference in Svennilson, 1954b, p. 11 to Svennilson 1939). Svennilson's reluctance to include item 1 in his *curriculum vitae* may seem too modest regarding his interpretation of Verdoorn's Law in earlier works. In *GSEE*, however, he emphasises that investments in new technology put a *competitive pressure* on older firms and plants. The struggle between old and new physical capital is conducted between firms in a particular industry or between producers of product substitutes. The transformation concept in *GSEE* made it possible for Svennilson to take steps in the

direction of a complete vintage theory and also to acquire additional perspectives on economic growth.

According to Svennilson, the transformation process has both exogenous and endogenous elements in relation to investments and production growth. Structural change is both a driving force behind and a function of production growth. Investments are a component of aggregate demand but also crucial for production and employment by their influence on the industrial composition. Conversely, transformation affects the amount and character of investments, e.g. by defining the conditions for the accelerator (Svennilson, 1954a, p. 7, 1954b, pp. 11-13 and 23-24).

Svennilson did not pay any particular attention to the effects of transformation on GDP (per capita), productivity and real wages in (Svennilson, 1954a, 1954b).[5] He could, for instance, have distinguished the direct and indirect effects of the six types of transformation on a country's labour productivity and terms-of-trade. Svennilson was mainly concerned with the effects of production growth on the separate components of transformation.

As earlier, Svennilson focused on the impact of production growth on the use of new process technologies (see item 1 above). The frequency of modern equipment is higher in an economy with higher production growth since investments are necessary to introduce the latest technologies (Svennilson, 1954a, pp. 9-11, 1954b, pp. 19-23). A modernisation of an industry, or even of the whole economy, may then be prevented by low production growth, unleashed for example by a contractionary economic policy, but also by rigidities in the transformation process. These rigidities will delay the switch to new technologies, the phasing-out of stagnating industries and the elimination of plants and firms with low productivity (se next section).

[5] Svennilson's rare use of quantiative measures and econometrics in *GSEE* primarily reflected the lack of comparable data but probably also an influence from Schumpeter and Dahmén. They had warned against the use of aggregate measures such as economic growth, GDP per capita and productivity at studies of transformation and evolution. These measures cannot grasp the underlying dynamic process or the full consequences of this process in terms of new or better products (Schumpeter, 1939, I, p. 134; Dahmén, 1980, p. 31, 1996, pp. 29 and 32). However, the validity of the Schumpeterian critique is limited by the fact that even structural economists may require macroeconomic quantitative measures. Further, economic prosperity is not only determined by structural change.

There remain, however, some fallacious in Svennilson's analysis of the relationship between production growth and the efficiency of the capital stock. He seems to overlook the possibility that a global competitive pressure may result in a significant decline and even elimination of industries, firms and plants in older industrialised countries which may offset the tendencies in these countries to a less efficient physical capital because of low production growth.

The struggle between old and new real capital takes definitely place on the international scene in *GSEE* (Svennilson, 1954a, pp. 4, 7, 13, 42, 45 and 185-196). Svennilson states that low-productivity plants in the first industrialised countries in Western Europe experienced harder competitive circumstances in the interwar period by the establishment of high-productivity plants in other countries. Later vintage theories confirm the thesis in *GSEE* that fast-growing new industrialised countries have a larger inflow of new plants, e.g. in new industries, and therefore a more modern vintage structure than older industrialised countries. The former countries have, because of their late industrialisation, a more modern vintage structure even at a uniform production growth (cf. Hahn and Matthews, 1970, pp. 382-386). Excessive investments in newly industrialised countries will put a strong *external* pressure on the least efficient vintages in the first industrialised countries.

But rigidities in the transformation process beside low production growth must then be *necessary conditions* for the validity of Verdoorn's Law in older industrialised countries. These rigidities exclude the possibility that productivity could be *raised* in countries with low production growth due to eliminations of "marginal" units and a transfer of free resources to high-productivity sectors and firms. Svennilson seems to avoid the possibility by an assumption that instant threats to plants, firms and industries in a country are neutralised by depreciations of the exchange rates or reductions in relative wages (Svennilson, 1954a, p. 13, 1954b, p. 30).[6]

In Svennilson's theory, production growth may stimulate transformation by other phenomena than the renewal of physical capital. Rising incomes and higher demand

[6] These offsetting measures will, according to Svennilson, not lead to economic recovery but, on the contrary, to lower real incomes and growth. For instance, a reduction in relative wages will result in an unfavourable specialisation in labour-intensive industries.

lead to changes in product composition, reflecting changes in income elasticities, and also to innovations by learning-effects in new industries (where both education and R&D is concerned) or the introduction of products and technologies that were unprofitable in the past. In the latter case, Svennilson gives a classical example – higher incomes and related new demand patterns created opportunities for the introduction of Fordist production methods in American automobile industry (Svennilson, 1954a, pp. 8-9, 1954b, pp. 15-16).

In addition, Svennilson discusses the possibility of complementary relations in the transformation process where the attainment of higher income levels is associated with new products and organisations. For instance, urbanisation and motoring led to new services and distribution channels. Here, Svennilson referred to Dahmén's notion of "development blocks" (see Svennilson, 1954b, p. 16; Dahmén, 1970, pp. 64-72; Eliasson, 2000, p. 221).

In his discussion of the mechanisms behind transformation, Svennilson was particularly interested in a variable that is strongly correlated to production – the level of employment or rather, the rate of unemployment. The interwar period made it obvious that unemployment could not only fluctuate in the short run but also show a trend.[7] Unemployment will delay the use of labour saving technologies and mechanisation by weakening the incentives for substitution of machines for labour. Further, labour abundance tends to reduce labour mobility. Finally, wage earners are unwilling to accept the introduction of new technologies if the rate of unemployment is high (Svennilson, 1954a, pp. 12, 36 and 52, 1954b, pp. 25-26).

To summarise this section, *GSEE* unveiled a new Svennilson in two respects. Firstly, the study was based on theories of short-run macroeconomic imbalances and cumulative processes in the Stockholm-school and Keynesian traditions. Secondly, by focusing on the transformation process in *GSEE*, Svennilson combined a dynamic Stockholmian-(post-)Keynesian and a Schumpeterian theoretical approach. Both syntheses

[7] We are here referring to trends despite Svennilson's opinion that analyses in the medium term do not justify a reference to secular developments (Svennilson, 1954b, p. 1).

made it natural for Svennilson to pay a particular interest to the effects of business cycle swings and economic policy on structural change.

3 Business Cycle Fluctuations and Economic Growth

Growth arguments for stabilisation policy

Business cycle conditions are central in *GSEE* when Svennilson presents the transformation problems in Europe in the interwar period, but surprisingly not when he expounds his theoretical views. Here, Svennilson pronounces, as in other publications, that the relation between economic fluctuations and growth is complicated, e.g. by the importance of time lags and reciprocal causalities (Svennilson, 1954a, pp. 10 and 12-13, 1954b, pp. 27-28, 1956, p. 257).

When analysing the effects of the business cycle on economic growth, Svennilson formulated a dilemma in a capitalist economy – profits must be sufficiently low to prevent the survival of firms and plants with low productivity, but sufficiently high to create financial prerequisites of a modernisation of remaining firms and plants. The business cycle is the traditional solution of the dilemma. Inefficient firms are eliminated in the depression when profits are low and surviving firms are modernised in the boom when profits are high (Svennilson, 1954a, p. 35).

A conclusion that Svennilson argued for large macroeconomic fluctuations in order to obtain high economic growth is near at hand. A Keynesian stabilisation policy could have delayed the elimination of marginal firms and made an expansion of vigorous firms more difficult. The conclusion seems to be supported by Svennilson's view of the central growth problem in early industrialised countries during the interwar period – a modernisation was often postponed during peaks since profits were not always high enough and an elimination of ineffective firms and plants was often prevented during depressions by rigidities in the adjustment process (Svennilson, 1954a, pp. 9-10 and 34-35). Svennilson gave many examples of such rigidities - financial endowments in ineffective firms, generous government supports to industries in crisis, protective duties, cartels, militant trade unions and conservative managers and owners (Svennilson, 1954a, pp. 10, 34-8, 48 and 51-52, 1954b, pp. 19-21).

Yet, Svennilson favoured an economic policy resulting in high and stable employment and activity levels although without excess inflationary tendencies (Svennilson, 1954a, p. 46). Svennilson referred to the importance of high profits for firm modernisation and to the positive side of the multiplicator-accelerator mechanism. Further, he emphasised that low unemployment will hasten the modernisation of established firms and industries and also the transmission of resources to new firms and industries. Svennilson was confident that productivity growth would be promoted by high production and employment levels in accordance with Verdoorn's Law.

An obvious objection to Svennilson's growth theory based on short run relationships is that an expansionary stabilisation policy may delay the retardation of low productive firms (and plants) and of stagnating industries. Svennilson's reply was that these plants, firms and industries will also face a real threat at high activity levels since new technologies are embodied in investments aimed at extending the production capacity. Besides, Svennilson states that adjustment barriers must be removed by structural reforms (trade liberalisation, anti-trust legislation etc.). Thus, his opinion was that the elimination of ineffective plants and firms and the phasing-out of stagnating industries should not be realised by deflationary policies but, on the contrary, by expansionary economic policies and improvements in the adjustment process. Svennilson was e.g. convinced that labour mobility would be promoted by measures to raise aggregate demand and/or improve the functioning of the labour market.

Limitations of a Keynesian growth policy

Although supportive, Svennilson did not ignore the weaknesses of a Keynesian growth strategy. There is an obvious risk in an inflationary economy that industrial renewal will be retarded. A high level of demand and a high rate of inflation are connected with low real debts for established firms and high profit margins. As a consequence, these firms have low capital costs and a high capacity for self-financing. Further, high profits make it easier for established firms to attract "credits from investors" (Svennilson, 1954, p. 34). On the other hand, new firms have difficulties in an inflationary economy to borrow capital at least without paying high rates of interest; it is new firms in particular that are suffering from rising interest rates in an overheated

economy.[8] Svennilson did not exclude the possibility that established firms and industries could be responsible for both modernisation and product developments in the economy (Svennilson, 1954a, pp. 34-35). But he regarded new firms as the main suppliers of new products exactly as Schumpeter had done, at least until (Schumpeter, 1942).

According to Svennilson, it is difficult to obtain both a high level of investment and an optimal allocation of resources. But the balance act will not lead to industrial stagnation in the general case. The expansion of established firms in an inflationary economy will often overshadow any tendencies to a low production growth as a consequence of misallocations of production resources. Further, high mobility in labour markets when unemployment is low will counterbalance any tendencies to a slow ”external” structural change. (Svennilson did not use the notions of ”external” and ”internal” structural change in *GSEE*.) In addition, high profits when aggregate demand is high will create incentives for entrepreneurship offsetting the tendency to less entrepreneurship due to rising interest rates. Svennilson was certain that the negative growth effects of a high activity level are only dominating in countries with hyperinflation (Svennilson, 1954a, p. 35).

Svennilson gives no room in *GSEE* for a conjecture that “internal” transformation will be promoted by *low* aggregate demand. For instance, he excludes the possibility that high actual profits may weaken firms’ innovation capabilities or investments in new knowledge. He further precludes the possibility that enforced innovations in a recession (or a depression) will become profitable in the following recovery and also lay the ground for a successful industrial development in the long run. These possibilities are discussed in an ”orthodox” Schumpeterian tradition (see next section). They are also stressed in the theory of transformation pressure developed in Sweden in the 1990s (Erixon, 1991, 2001).

It is a weakness in *GSEE* that the polar driving forces ”pressure” and ”opportunities” have an unambiguously negative and positive impact respectively on the willingness

[8] Svennilson (1954a, pp. 24, 34-36 and 49-50). Svennilson claimed on historical grounds that expectations of depreciations in an inflationary economy will lead to higher rates of interest and/or capital export.

of firms to invest in knowledge and on their capacity to produce new knowledge. Svennilson did not even suggest in *GSEE* that rationalisations could be encouraged by a recession. Recoveries/peaks will always have a positive effect and recessions/troughs always a negative effect on firms' productivity.

Svennilson had in fact formulated a behaviour hypothesis at the end of the 1930s and the beginning of the 1940s that was more in line with the theory of transformation pressure. Despite an expected recession, the prospects were good for Sweden in the medium-term considering that the individuals' power of initiative and energy might be stimulated by difficulties. Here, but not in *GSEE*, a cumulative positive development will emerge by a *negative* demand shock (Svennilson, 1942; Henriksson, 1990, pp. 93 and 170). Svennilson was too shaped by the postwar Keynesian revolution to keep hold of an "orthodoxian" Schumpeterian hypothesis like that in *GSEE*.

4 Did Svennilson become a Schumpeterian?

Svennilson and the Schumpeterian view of innovations

Svennilson considered in *GSEE* that business cycle phenomena might have growth effects and that the business cycle is formed by the transformation process. This integration between business-cycle and growth analysis was compatible with a Schumpeterian theoretical perspective. By his basis in the Stockholm school, Svennilson found it natural to concentrate on the impact of business-cycle variables on economic growth. In contrast, Schumpeter had primarily analysed the importance of innovations for business cycles of varying length in *Business Cycles* (Schumpeter, 1939). Dahmén was strongly influenced by *Business Cycles* even though he studied the transformation process *per se* rather than the effects of this process on the business cycle. He asserted that business cycle swings in Sweden had become more internationally determined over time but also been shaped by domestic stabilisation policies in the interwar period (cf. Dahmén, 1970, pp. 29-43 and 403-410). In fact, Svennilson had a similar exogenous view of the business cycle when analysing individual countries in *GSEE* (Svennilson, 1954b, p. 27). The interesting question is whether there are significant differences between Svennilson and the Schumpeterians where the analysis of similar industrial problems is concerned.

Svennilson's and Dahmén's notion of economic transformation includes Schumpeter's innovations, i.e. new technologies, organisations, products and markets, but also the struggle between these novelties and established technologies etc. (cf. Schumpeter, 1939, Volume I, p. 84; Dahmén, 1970, p. 4). Thus, their definition of transformation considers not only innovations *per se* but also the consequences of innovations for competitive conditions and demand patterns. Svennilson's and Dahmén's concentration on the transformation process is reasonable regarding the difficulties to define innovations without taking account of the effects of new technologies etc. on demand and competition.

However, Svennilson's and Dahmén's transformation concepts are not identical. Svennilson considers not only the effects of innovations on market rivalry and demand structures but also the diffusion of innovations between firms and industries. There are other conceptual differences between Svennilson and Dahmén. Transformation is only determined by innovations in (Dahmén, 1970). Analogously, "economic evolution" is only explained by innovations in Schumpeter's *Business Cycles* even if the term is general enough to cover the diffusion of innovations (see Schumpeter, 1939, Volume 1, p. 86). In *GSEE,* transformation is also affected by autonomous changes of population, demand patterns and saving ratios, trade and economic policies and by strategic firm decisions (Svennilson, 1954a, p. 11, 1954b, p. 13).

Svennilson mentions a more essential difference between him and the Schumpeterian economists – he has another view of the prime driving forces behind innovations, particularly in comparison with Schumpeter. By Schumpeter's emphasis on entrepreneurship, innovations are exogenously determined, at least in relation to demand, in *Business Cycles* (Svennilson, 1954b, pp. 13-14). Needs are not prime driving forces but possibly necessary conditions for economic development. "In many cases", demand is simply a consequence of entrepreneurship (Schumpeter, 1939, Volume II, p. 1035). Schumpeter takes a further step in the first volume of *Business Cycles* by claiming "that the great majority of changes in commodities consumed has been forced by producers on consumers…". He even maintains that a consumer-led economic evolution "…is not important enough to matter…" (Schumpeter, 1939, Volume I, pp. 73-74).

Dahmén's principal view of innovations is similar to Schumpeter's. It is true that Dahmén makes a distinction between "demand pull" and "supply push" when analysing the expansion of progressive industries. But production increases due to demand pull are not associated with innovations or even with a transformation. For example, stabilisation policies influence GDP growth by its immediate aggregate demand effects and not by their impact on the transformation process.[9] (A stabilisation policy without any innovation effects may still lead to transformation according to Svennilson's conception.) A supply push, with Dahmén's terminology, will emerge by exogenous innovations in line with Schumpeter's view (Dahmén, 1970, pp. 47-48). It is true that Dahmén discussed the possibility of demand-led innovations. Svennilson called attention to Dahmén's hypothesis, especially in his theory of development blocks, that changes of national income and GDP can influence the transformation process (Svennilson, 1954b, p. 6). Dahmén, however, was not inclined to put a strong weight on a demand-led innovation mechanism. Innovations have almost always to some extent, and very often to a full extent, created their own markets by leading to improvements of product qualities and/or price reductions (Dahmén, 1970, p. 68).

Dahmén does discuss the possibility of cumulative economic processes in (Dahmén, 1970). Here, Dahmén refers not only to the emergence of a virtuous GDP growth circle *per se*, similar to Svennilson's two cases of cumulative processes (where innovations are ignored), or to a dissemination of new technologies between industries. Dahmén also discusses the possibility that the expansion of progressive industries leads to new innovations either within or outside these industries. However, true to the ideas of innovation clusters in *Business Cycles*, Dahmén focused on supply mechanisms in his discussion of a cumulative innovation process (cf. Schumpeter, 1939, Volume I, pp. 100-101 and 131). Some innovations will either create new innovations because of complementary technologies and the formation of entrepreneurial skill or increase the profitability of old innovations (Dahmén, 1970, pp. 72-75).

[9] Svennilson questioned, although without any explicit reference to Dahmén, that an economic expansion is possible without transformation: "'uniform progress' without transformation can be regarded only as a highly abstract and theoretical conception" (see Svennilson, 1954a, p. 7, 1954b, p. 12 and also Schumpeter, 1939, Volume I, p. 94).

Svennilson agreed with Schumpeter and Dahmén that entrepreneurship is a necessary condition for innovations. But he also emphasised that demand is a necessary condition for the creation and spread of new ideas. High demand and production growth will e.g. speed up technological progress and the use of new technologies (Svennilson, 1954a, p. 9, 1954b, pp. 17-18).

Schumpeter's and Dahmén's strong accentuation of entrepreneurs as creators of demand makes it difficult to establish a consensus around Svennilson's conditional hypothesis that high demand and production growth, exactly as entrepreneurship, are necessary conditions for innovations. However, by his Verdoornian interpretation of the relationship between production and productivity growth, Svennilson himself was restricted in arguing for a conditional view. His Verdoornian interpretation is more reasonable if demand factors have a stronger influence than supply factors over the innovation process. By pleading for Verdoorn's Law in *GSEE*, Svennilson contributed to the discrepancy between a Schumpeterian and Keynesian analysis of innovations.

Moreover, studies of Swedish industrial developments in the interwar period offer no unambiguous support to Svennilson's conditional hypothesis that high demand is a necessary condition for innovations. The lack of a strong demand pull in the 1920s, reflecting low domestic demand growth, was compatible with a widespread introduction (often by established firms) of new production methods, organisations and products (Dahmén, 1970, pp. 125-131 and 393-403). Further, Svennilson's Verdoornian interpretation of the positive correlation between production and productivity growth in Swedish manufacturing in the interwar period is not obvious. A supply-oriented transformation of Swedish manufacturing in the 1920s, primarily by firms' adoption of U.S innovations, may have laid the ground for a high production growth in the 1930s contradicting Verdoorn's Law.

The Schumpeterian critique of Keynesianism

There are other reasons for a controversy between Svennilson and Schumpeterian economists than their diverging views of the determinants of innovations. Svennilson is hit by Schumpeter's criticism of post-Keynesian(-Kaleckian) theories of cumulative endogenous processes.

Schumpeter emphasised in his critique of Michal Kalecki's accelerator theory (where time lags are assumed) that an initial investment, or even an initial innovation, cannot produce a sustainable cumulative process unless new "disturbances" occur. The initial disturbance will be neutralised by an equilibrium mechanism characterised by changes of factor prices (due to inelastic supply) and interest rates (Schumpeter, 1939, Volume I, pp. 78-79, 89-91, 131-132 and 185-188). We have earlier given examples of endogenous innovation processes that are either supply-initiated (see Schumpeter and Dahmén) or demand-initiated (see Svennilson). However, Svennilson's two cases of cumulative processes in *GSEE* were *not* based on an explicit assumption of endogenous innovations. His growth theory suffers then from the same weakness as Harrod's and Kalecki's original cumulative models according to Schumpeter's (legitimate) critique.

It would have been easy for Svennilson to refer to the importance of demand conditions and production growth for innovations when explaining the emergence of a durable cumulative process. He could also have referred to the existence of rigidities (and related time delays) when prices, wages and interest rates are adjusted to individual macroeconomic shocks permitting cumulative processes at least in the medium term. Yet, it is not certain that Svennilson would have succeeded to bridge the gap between the Keynesians and their Schumpeterian reviewers by a reference to endogenous innovations or inertia in the adjustment process when analysing cumulative processes.

Schumpeter's critique of Keynes's *General Theory* for being too static and too aggregate for making a proper diagnosis of stagnation problems in aging industrialised countries is well known. But both Åkerman and Dahmén had a profound sceptical attitude towards the Stockholm school as well. They regarded the Keynesian, Stockholm-school and also the neoclassical theories as examples of "calculation models" (choice-theoretical analysis) characterised by an abstract notion of time and an indeterminate institutional framework (Åkerman, 1960, pp. 279-283). Calculation models are tools of economic planning rather than devices for analyses of historical relations. Instead, Åkerman and Dahmén advocated "causal analysis" in economics, an economic-historical approach that does not exclude partial studies or the distinction of

stable relationships and prime driving forces (Åkerman, 1960, p. 271-276; Dahmén, 1970, p. 8, 1980, pp. 38-39). According to Åkerman and Dahmén, Schumpeter satisfied the criteria for causal analysis in *Business Cycles*. The question is whether Svennilson's analysis in *GSEE* was dynamic and institutional enough to convince Swedish Schumpeterians that he had turned from calculation models to causal analysis.

Åkerman and Dahmén often rejected that analyses based on macroeconomic concepts such as production growth, investments and factor prices are causal in a real sense. Svennilson was never a direct target, but the sequential analyses in (Svennilson, 1938) and also the Stockholmian-Keynesian analysis in *GSEE* may both be hit by Åkerman's and Dahmén's critique. In addition, Svennilson's programme for historical studies in economics after the publication of *GSEE* shows that he was anxious to draw a clear line between economic and historical analyses. An inevitable specialisation of labour between economists and historians could imply that economists concentrate on the relation between investments and production growth and on determinants that are easiest to affect. Historians, on the other hand, could investigate how investments are determined by the social structure and political environment of the entrepreneurial class (Svennilson, 1954b, pp. 2 and 4-5, 1956, pp. 258-259).

An application of Svennilson's programme for economic analyses of historical processes restricts the possibilities to develop "institutional economics". Further, parts of Dahmén's analysis of the transformation process in Swedish industries in the interwar period will fall outside the domain of economics (cf. Dahmén, 1970, pp. 56-58). In fact, when analysing obstacles to transformation in Western Europe in the interwar period, Svennilson went beyond his own research programme for economists.

Reconciliation and remaining divergences

The methodological disparity between Dahmén and Svennilson shall not be exaggerated. Eager to mark a difference between a historical and firm-oriented research on the one hand and a structural economic analysis on the other hand, Dahmén has approached the methodological position of Svennilson. In the 1980s and 1990s, Dahmén emphasised the merits of a macroeconomic, and even of an economic-political, perspective on the transformation process (cf. Dahmén, 1980, pp. 35-45 and Dahmén,

1989, pp. 15-20). At the same time, Dahmén opposed economic-history studies that used macroeconomic concepts but were characterised by sweeping, often history-philosophical, statements about different social development phases (Dahmén, 1989, p. 17). Dahmén's criticism was probably directed at studies of long waves by the so-called Lund school of economic history. But the critique did also hit the main inspiration source of (Dahmén, 1970) – Schumpeter's *Business Cycles*. However, the time, industry and country specific character of *GSEE* made Svennilson immune to this type of critique.

Dahmén has not only converged to Svennilson's methodological standpoints in *GSEE* in later decades. He has also showed an appreciation of Svennilson's synthesis between a supply-oriented Schumpeterian and a demand-oriented Keynesian view of innovations (Dahmén, 1980, pp. 43-44). Besides, in his enumeration of neglected research issues in mainstream economics, Dahmén has given an even stronger precedence to the hypothesis in *GSEE* that new firms are disfavoured by inflation and expansionary economic policies (cf. Dahmén, 1995, pp. 14-15, 1998, pp. 71-74).

The renewed interest in innovations and entrepreneurship in economics since the 1970s has facilitated the incorporation of Svennilson in a Schumpeterian tradition. Neo-Schumpeterians have a strong preference for Jacob Schmookler's innovation theory. Here, high demand will stimulate R&D investments and other knowledge-enhancing activities, primary by its positive effects on expected sales, thus by an accelerator mechanism (Schmookler, 1966, 1972). In addition, during the latest decades, technology historians have pronounced the reciprocal relationship between product and technology developments on the one hand and demand conditions on the other hand (Kline and Rosenberg, 1986, pp. 289-290).

Richard Nelson and Sidney Winter have formulated a neo-Schumpeterian cumulative model where profits in innovative firms will lead to new innovations by facilitating the financing of R&D investments. (The model assumes scale advantages in R&D.) The pioneer firms will thereby obtain new innovation profits which in turn will result in new R&D investments and innovations etc. Nelson and Winter had the ambition to describe an endogenous concentration process but also to explain macroeconomic growth. Overall productivity growth is stimulated by the fact that innovations by the

pioneering firms are imitated by other firms (Nelson and Winter, 1978, pp. 525-541; Nelson, 1995, pp. 68-72).

Nelson and Winter's neo-Schumpeterian analysis of a cumulative growth process is not identical to Svennilson's in *GSEE*. In the Nelson-Winter model, the self-reinforcing effect arises by the importance of self-financing, not by the accelerator. However, by its focus on a business-cycle variable, profits *ex post*, the difference to Svennilson's cumulative theory is marginal only. (In other "Schumpeterian competition models", the amplifying effect emerges by learning-by-doing.) Since Svennilson did not define the origin of the cumulative process, it is also possible to allude in his case to a random innovation as in the Nelson-Winter model.

But Svennilson's growth theory in *GSEE* and the neo-Schumpeterian theory of cumulative growth deviate both from the theory of transformation pressure. The latter theory is based on a hypothesis that innovations, or the spread of innovations, are stimulated by *low* demand and *low* profits. We have already related this hypothesis to Svennilson's earlier work and also to an orthodox Schumpeterian tradition despite its peripheral position in *Business Cycles* (Schumpeter, 1939, Volume I, pp. 134, 143 and 189). Schumpeter's main thesis is that prosperity inevitable leads to recession but prosperity (after a recovery) is explained exogenously by entrepreneurship, not by the preceding recession (Schumpeter, 1939, Volume I, pp. 139 and 156-157). Schumpeter's and Dahmén's concepts "creative destruction" and "the negative side of the transformation (development) process" respectively were devices to analyse the consequences, not the determinants, of innovations (cf. Dahmén, 1970, pp. 46, 49 and 394). But orthodox followers of Schumpeter have emphasised that innovations are stimulated not only by intense competition and low entry barriers but also by depressions (Van Duijn, 1983, pp. 137-143).

Svennilson's theory in *GSEE* and the orthodox Schumpeterian theory both assume that production growth influence productivity growth and not vice versa as in Schumpeter's and Dahmén's main cases. But the character of the relationship differs in the two theories. According to the orthodox Schumpeterian theory, high production growth will lead to *low* productivity growth. Svennilson's correlation studies of Swedish manufacturing in the interwar period do not exclude a delayed negative rela-

tionship of this kind. High productivity growth in the 1920s may have been caused by a hard international competitive pressure but also by a restrictive monetary and exchange-rate policies and a depression in the beginning of the decade (cf. Dahmén, 1996, p. 37).

This section has discussed whether Svennilson, by focusing on innovations and transformation processes and by integrating business-cycle and growth analyses, became a Schumpeterian economist in *GSEE*. Svennilson's emphasis on the importance of demand and production growth has no correspondence in preceding works by Schumpeter and Dahmén. A consensus about a thesis that both entrepreneurship and demand are necessary conditions for innovations seems possible. But a consensus is hindered by the superiority of entrepreneurship in Schumpeter's and Dahmén's works. A theoretical synthesis is further prevented by Svennilson's Verdoornian view of the relationship between production and productivity growth and by his cumulative growth models without endogenous innovations. Methodological divergences also exist between Svennilson and the Schumpeterians because of Svennilson's delimitations to institutional economics and the Åkerman-Dahmén's critique of "calculation models". However, the antagonism between Svennilson and the Schumpeterians has been mitigated by Dahmén's convergence to Svennilson's methodological and theoretical positions and the development of a neo-Schumpeterian theory, in which short-run macroeconomic variables may generate reinforcing cumulative processes. A complete convergence between Keynes and Schumpeter by Svennilson's mediation is excluded by an orthodox Schumpeterian hypothesis that *low* demand and production growth is beneficial for innovations and productivity. However, the hypothesis has a direct counterpart in Svennilson's writings before *GSEE*.

5 Growth analyses in the spirit of Svennilson

According to an influential argument in Sweden in the early 1990s, repetitive devaluations of the SEK had contributed to a relatively poor productivity performance of Swedish manufacturing during the two preceding decades. The devaluations were accused of having delayed external structural change and weakened firms' propensity to rationalise and introduce new organisations, products and production methods. The

Swedish Productivity Commission concluded that transformation pressure was too weak, particularly during the 1980s (Swedish Productivity Commission, 1992).[10]

The relationships between exchange rate policies, transformation pressure, structural change and productivity were analysed in an expert report to the Swedish Productivity Commission. The report was e.g. inspired by the Swedish growth school including *GSEE*. However, the report's main hypothesis that Swedish growth had been hampered by devaluation policies was an obvious break with Svennilson's Verdoornian view in *GSEE*. The general theory of transformation pressure was based on cognitive psychological research on individual attitudes and creativities at external threats (see Erixon, 2001). The theory was in accordance with, although not directly influenced by, Svennilson's works before *GSEE*.

The expert report under discussion defined some structural variables that were seen *a priori* as strategic when analysing the effects of devaluations on productivity. Modern trade theory had up to then only analysed the structural effects of devaluations in terms of a reallocation of resources from the sheltered to the open sector (see Jones and Corden, 1976; Norman, 1986). These models were too disaggregate to capture the effects of exchange-rate changes on a country's economic growth but simultaneously too aggregate to give a diversified picture of the structural effects. William Baumol *et al* have discussed the effects of devaluations/depreciations on national growth (Baumol, Blackman and Wolff, 1989). They raised the question whether devaluations/depreciations could neutralise the negative GDP effects of a relatively weak productivity performance. Their analysis confirmed the hypothesis of the Swedish Productivity Commission that devaluations could hamper economic growth. However, the conclusion of Baumol *et al* that devaluations will specialise countries in industries using cheap labour as a competitive advantage is not obvious. Further, strate-

[10] The notion of "transformation pressure" was invented by Dahmén. However, it had another meaning in (Dahmén, 1970) than in later works by Dahmén. In (Dahmén, 1970), "pressures from the negative side of the development process" and "the negative side of the transformation process" (see Sect. 4 above) were synonymous concepts covering the *consequences* of innovations. In the course of time, Dahmén began to use the concept "transformation pressure" when analysing the *driving forces behind* innovations, but he did not reserve it first for the case of *negative* driving forces (Dahmén, 1980, pp. 46-47, 1986, pp. 119-120, 1989, p. 6). The present Swedish view of transformation pressure as a negative external driving force was formed in the beginning of the 1990s by the Swedish Productivity Commission – a transformation pressure will arise on individual firms if external events result in a significant profit decline and even in a real threat to the firms' existence unless steps are taken to increase their productivity (cf. Erixon, 1991, pp. 261-263, 2001, pp. 6-9; Dahmén, 1998, p. 67).

gic structural variables were missing when they disentangled the impact of devaluations on industrial structure

The expert report to the Swedish Productivity Commission defined nine structural variables which could be strategic for the relationship between devaluations and productivity or productivity growth on the industry and country level: 1) export share 2) import penetration 3) relative weight for imported inputs 4) foreign borrowing, 5) frequency of new establishments, 6) vintage structure, 7) R&D intensity, 8) firm concentration and 9) capital intensity. The study did not settle *a priori* the nature of the relationship between these structural conditions and productivity in case 1, 2, 3, 4 and 8. For example, a significant increase in profit margins after a devaluation in countries and industries with high export shares will hamper productivity growth according to a hypothesis about the advantages of transformation pressure. But higher profit margins may enhance productivity if self-financing is important for investments (embodying new technologies) and profit expectations are strongly governed by actual profits.

The structural analyse above was partially inspired by *GSEE* (Erixon, 1991, pp. 251-252, 294-302 and 391-392). The inclusion of item 5 mainly reflected the subtle discussion in *GSEE* of the relationship between business-cycle conditions and the frequency of new firms. Svennilson had not excluded the possibility that an expansionary economic policy could favour established firms at the expense of new firms. The study for the Swedish Productivity Commission assumed that new firms may benefit less than established firms from a devaluation and that they can even be worse off. But the study did not define *a priori* whether devaluations have a positive or negative effect on the frequency of new establishments (see Erixon, 1991, p. 301).

The study for the Swedish Productivity Commission was not based on a theory of mutual cumulative relations as *GSEE*. The assumption was made that individual exchange-rate changes have temporary effects only on GDP if industrial composition effects are ignored. For instance, a devaluation will induce nominal wage increases and also impede productivity if productivity moves countercyclically as expected in the theory of transformation pressure. (We are referring here to measures of total factor productivity and labour productivity based on variable labour.) In the first case, the expert report followed Schumpeter and neoclassical equilibrium economists rather

than Svennilson. Further, it was assumed in the study under discussion that globalisation of financial markets has gradually made it more difficult in small open countries to create virtuous growth circles by expansionary economic-policy measures. Since the devaluation effects on profit margins were assumed to be temporary, it was also expected that the effects on firms' productivity (level or growth) were temporary whether higher profit margins have a positive or negative impact on productivity.

A confirmation of a hypothesis that the negative (or positive) effects of an expansionary economic policy on firms' productivity are temporary only does not exclude the possibility that individual devaluations could have hampered (or promoted) growth during a particular decade. The view is confirmed by the productivity development in Swedish manufacturing during the 1980s but also by the strong recovery in productivity during the first part of the 1990s. A harder transformation pressure then induced firms to use the large potentials for rationalisation that had been built up in the 1980s and to speed up the introduction of new work organisations. Further, the validity of a theory that economic policy measures have temporary effects only on firms' productivity does not preclude the possibility that devaluations may have a permanent effect on aggregate productivity (level or growth) by their impact on industrial structure. A possible transfer of resources to firms and industries with low productivity levels and productivity growth will, *ceteris paribus*, reduce overall productivity growth. Thus, Svennilson's conclusion that economic policy has long run effects on economic growth was not excluded in the study for the Swedish Productivity Commission even if the multiplier-accelerator theory was rejected.

6 Svennilson and modern macroeconomics

The neoclassical new-growth theory has in common with the theory of *GSEE* that the development and use of new technologies or better, of new knowledge, is an endogenous process (P. Romer, 1986, 1990; Grossman and Helpman, 1994; Barro and Sala-i-Martin, 1995; D. Romer, 2001, ch. 3). In many new-growth models (including Paul Romer's original one), human capital and also the existence stock of knowledge, are inputs in the production of new ideas. Internal learning effects and technological complementaries explain why investments in R&D and human capital will, under some assumptions, start a cumulative process of sustainable and even accelerating la-

bour productivity growth. In addition, investments in R&D, human capital and also in physical capital could lead to sustainable growth if they are connected with positive spillover effects. Moreover, the new-growth literature makes references to learning effects in the production of goods and – as Svennilson in *GSEE* – to embodied technological progress (see Hammond and Rodriguez-Clare, 1993, pp. 399-400).

The development of new knowledge is also endogenous in the new-growth theory by the assumption that firms have the opportunity to appropriate (temporary) monopoly profits by patents etc. By their analysis of the innovation process and treatment of monopoly profits as a market incentive for investments in R&D, new growth theorists have paved the way for a synthesis between the neoclassical growth theory and (parts of) the Schumpeterian theory (Aghion and Howitt, 1998).

Svennilson's analysis of innovations and cumulative processes in *GSEE* did not inevitably make him a precursor of the new growth theory or of the neoclassical-Schumpeterian symbiosis. In his reproduction of a self-reinforcing cumulative process, the development of new ideas was not endogenous and investments were not associated with knowledge-spillover or learning effects. Solow's basic neoclassical growth model had showed for the case of macroeconomic balance that increases in saving and investment ratios have no permanent impact on labour productivity growth if the returns on physical investments are decreasing and technological progress is exogenous. New-growth theorists then added that higher saving and investment ratios are unable to boost productivity growth even if unemployment prevails in the initial state. The tendency to decreasing returns on physical investments becomes decisive at a growing shortage of labour (cf. Aghion and Howitt, 1998, pp. 24-25).

It is true that fiscal stimulants may have a positive effect on growth in the long run in the new growth theory, exactly as in Svennilson's cumulative case without any macroeconomic balance. But in the new growth theory, the subsequent increase in investments is associated with the development (or spread) of new knowledge. Further, investments are influenced here by supply-side changes, for instance, a higher saving ratio, not by the accelerator as in Svennilson's theory. New-growth economists take for granted that a positive demand shock or a lax economic policy will generally lead to increases in interest rates and nominal wages; they refer here to the appearance of

input shortages (as Schumpeter) or to rational expectations. The adjustment mechanism will even prevent a permanent increase in investments, and thus a sustainable increase in the level of labour productivity, in the case of embodied technological progress.

It is perhaps anachronistic to blame Svennilson for not having defined in the mid 1950s under which conditions a cumulative economic development will arise and generate long-run economic growth. Nevertheless, Svennilson seemed to have abandoned the multiplicator-accelerator theory after the breakthrough of neoclassical growth theory.

In the mid 1960s, Svennilson formalised a vintage theory within the framework of a neoclassical one-commodity model with perfect competition on product and labour markets (Svennilson, 1964). He assumed that new technologies could be either capital or labour intensive and, further, more or less difficult to apply to older vintages. It can be questioned whether Svennilson made any significant contribution to the vintage theory already developed by Solow and Salter. By its formal-analytical character and, especially, its neoclassical equilibrium framework, Svennilson's vintage model is predominantly of interest for being a break with the approach of *GSEE*. Svennilson excluded the possibility of a multiplier-accelerator mechanism by an assumption that full employment is always guaranteed by stabilisation policy.

Thus, Svennilson's conversion to neoclassical economics in the 1960s did not result in any attempts by him to model an endogenous knowledge process, but merely in a departure from the multiplier-accelerator theory. It is other publications than *GSEE* and (Svennilson, 1964) that warrant a conclusion that Svennilson was a forerunner of new growth theory. Since the mid 1950s, Svennilson had discussed the importance of human capital and R&D for the development and use of new knowledge, the relationship between R&D and human capital, learning effects in the production of goods and knowledge, and the existence of technological spillover effects (see e.g. Svennilson, 1966).

But Svennilson's position as a forerunner of new growth theory does not automatically render him a status as a good theoretical example today. New-growth econo-

mists have already defined under which conditions a cumulative innovation process will lead to temporary and permanent growth in labour productivity. Their conclusions are based on explicit assumptions about population growth, proportions of physical capital and population (or human capital) in the production of new ideas, product and labour market conditions, the character of technological progress and about marginal returns on investments in R&D, physical capital and education.

To summarise, the analysis by new growth economists of cumulative knowledge processes and their specification of the conditions for sustainable growth have reduced the validity of Svennilson's growth theory. In addition, many new-growth economists have adopted a transformation perspective reminding of that in *GSEE*. They make a distinction between finished goods and input goods industries, knowledge and product producing industries, and further between export and home market industries (see e.g. Grossman and Helpman, 1991). The sociological, political and psychological restrictions on the transformation process are seldom accounted for in the new-growth theory. But it is difficult to criticise the theory on these grounds following Svennilson's programme for an economic historical research.

At the same time, a conclusion that the new growth theory is superior to Svennilson's theories in *GSEE* in all respects is too hasty. New-growth models give a more stylized picture of the driving forces behind innovations than Svennilson's corresponding analysis in *GSEE*. Their specification of the conditions for balanced (or optimal) growth when new knowledge is endogenous has widened rather than narrowed the gap between theoretical and empirical analysis in growth economics. It is not obvious that new growth theories serve as a better guide to historical studies than "inductive" theories of the type that are dominant in *GSEE*.

We will finally compare the analysis of the business cycle in *GSEE* with the analogous analysis in modern macroeconomics. Macro economists often raise objections to the Keynesian assumption of procyclical profit margins (cf. Keynes's view in *General Theory*). Svennilson made a similar assumption, although implicitly, in *GSEE*. But modern macroeconomists find it equally plausible that profit margins vary countercyclically because of rigidities in the price adjustment process (in combination with flexible nominal wages) or countercyclical mark-ups. Their expectations that profit

margins and mark-ups will move countercyclically are confirmed by the empirical literature, at least for major OECD countries (Galeotti and Schiantarelli, 1998; Martins and Scarpetta, 1999; Romer, 2001, pp. 26 and 258-260).

But there are indications that profit margins in small Western European countries move cyclically in accordance with Svennilson view, particularly if the countries are specialised in exports of raw materials and semi-finished goods (cf. Lindbeck, 1993, 96-98). Here, export prices fluctuate strongly while nominal wages adjust slowly to changes in aggregate demand e.g. due to central wage negotiation arrangements. Svennilson's view of the relationship between economic policy and profit margins is confirmed by analyses of devaluation policies in Sweden in the 1970s and the 1980s. Prices and profit margins increased after a devaluation, instantly or with a delay depending on the ability of domestic firms to control world market prices (Erixon, 1991).

In any case, Svennilson's analysis of the relation between the business cycle and economic growth does not need any assumption of procyclical profit margins. The crucial point in his integrated business-cycle and growth theory is that firms' ability to self-finance investments is raised in an economic recovery. It is procyclical (real) profits rather than procyclical profit margins (or countercyclical real wages) that are necessary conditions in Svennilson's theory. Profits, and also profit shares, are often more procyclical than profit margins because of fixed labour costs.

7 The relevancy of *GSEE*

The development, introduction and spread of new ideas are an uncertain, disorderly process (Kline and Rosenberg, 1986). At the same time, some technological and commercial breakthroughs put distinct restrictions on the development of new ideas by complementarities between technologies or products, learning-effects in production and R&D, and the existence of technique-specific educations and organisations (cf. David, 2001). Other growth trajectories will be eliminated or survive in the wake of successful technology systems and product designs. Sometimes, ideas developed along a discontinued or marginal growth trajectory may become of interest within a winning technological paradigm or because of new demand patterns. It is true that

these ideas are often dispensable for the further development of new technologies and products. But the current knowledge stock might have been larger if alternative growth paths had been allowed to coexist on equal terms with the leading invention and innovation systems.

The synthesis between Keynes and Schumpeter in *GSEE* did not become the cornerstone of a new ”growth trajectory” in economics that the author had hoped for. Later growth theories of balanced growth and embodied technological progress were not influenced by *GSEE*. By their one-commodity models, neoclassical growth theorists focused on some aspect of transformation or neglected the transformation process completely. Further, economists in the Schumpeterian and Keynesian traditions (outside Sweden) were not influenced by *GSEE* and they were uninformed of that Verdoorn’s Law was Svennilson’s Law.

Svennilson’s emphasis on product market conditions and application of cumulative macroeconomic theories when analysing innovations and economic growth was unique for the time of *GSEE*. But the question is whether Svennilson’s theoretical perspective is still valid. A stronger position in economics for ideas similar to those of *GSEE* during the 1950s and the 1960s might have enriched the analysis of the driving forces behind innovations during later decades and also made the current separation between short-run and long-run analysis in macroeconomics more difficult. Further, endogenous growth theory could perhaps have been developed earlier if Anglo Saxon economists had been acquainted with Svennilson’s analysis of human capital and R&D. But it is not obvious that economists have something to learn from Svennilson today. There are reasonable arguments that *GSEE* and other works by Svennilson have been made obsolete by later theoretical and methodological developments.

New growth theory has overcome many of the limitations in Svennilson’s analysis of cumulative processes in *GSEE*. Further, refined statistical methods during later decades have made it possible to estimate static and dynamic structural effects when analysing changes in productivity and market shares; consequently, the current empirical literature in economics gives in many respects a more informative picture of the transformation process than *GSEE*. Further, industry-structural conditions are considered both in cross-sectional and times series analysis today. Moreover, contemporary stud-

ies of regional networks, social capital and corruption in mainstream economics are more "institutional" than Svennilson's structural analysis in *GSEE*. Finally, his proposal of a labour division between economists and historians is a straitjacket at the development of an institutional theory of economic growth.

Svennilson's proposal for a division of labour between economists and historians has, together with his "neoclassical" vintage model in the 1960s and the theoretical-methodological development in economics, weakened the arguments for regarding him as a pioneer in an alternative paradigm. Further, Svennilson's works offer poor guidelines for a separation between a "structural-analytic" and a neoclassical theory of growth. Economists in both camps certainly agree with Svennilson that an economic study is more macro oriented, partial and aimed at measuring causal relations than a pure historical study.

However, there are some indications that Svennilson's research is relevant today. His diversified "Keynesian" theory that growth will be injured by unemployment is still exclusive and accurate. The theory can compete with a Kirzner-Schumpeterian theory that entrepreneurship is promoted, more or less deliberately, by unemployment (cf. Demmert and Klein, 2003, Sect. 9). However, Svennilson's main contributions to today's growth theory are paradoxically two theories that are either peripheral or absent in *GSEE* and further, may end in an un-Keynesian view of economic policy.

The theory in *GSEE* that inflation and an expansionary economic policy can hamper economic growth by crowding-out new firms from the capital market has no direct correspondence in the neoclassical, post-Keynesian or even the neo-Schumpeterian literature. This structural theory, contradicting Verdoorn's Law and the cumulative growth theory of *GSEE*, is a fruitful starting-point for a discussion of industrial locking-in effects (cf. Erixon, 1997, pp. 78-79). Further, the embryo of a psychological growth theory in other works by Svennilson is an alternative to the mechanical view that permeates *GSEE*s theoretical sections (see the accelerator theory in particular). Growth economists can learn from modern psychological research and the current attempts to integrate psychology and economics (cf. Rabin, 1998; Erixon, 2001).

The main argument for reading *GSEE* today is not that the study gives invaluable insights in the growth process of post-industrialised, or even of developing, countries but that it demonstrates the strength of Svennilson's research strategy. Firstly, the integration of short run and long run macro analysis in *GSEE* is still a promising angle of approach for empirical research despite some shortcomings in Svennilson's theory of cumulative growth. Secondly, *GSEE* was based on economic theory but also on extensive statistical and historical knowledge influencing the specification of empirical questions and the choice of possible explanations and ultimate theoretical designs. Svennilson's verbal, empirical-oriented, analysis in *GSEE* is an example of "appreciative" rather than "formal" theorising using Richard Nelson's classification of growth theory (Nelson, 1998). Nelson does not share the dominant opinion among economists that appreciative research is less valuable than formal model-oriented analysis. It is often appreciative researchers who are responsible for new theoretical perspectives and insights. The paradigm founders themselves have stressed the value of case studies, inquiries and historical investigations before modelling the innovation and growth process (Solow, 1994, p. 53) and also of economists who pursue both economic theorising and studies of history and statistics (Samuelson, 1966, p. 588). *GSEE* was written by an economist who had the ambition to integrate theoretical and empirical research. It is not the ideas of *GSEE* that are indispensable in economics today but a new generation of economists who works in the tradition of Svennilson.

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